ENTERO-ANASTOMOSIS FOR MALIGNANT STENOSIS OF THE DIGESTIVE TRACT.[1]

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AT a meeting of this society, held on March 23, 1892, I exhibited two patients upon whom I had operated during the previous year for the relief of symptoms due to malignant stricture of the digestive canal. Both these patients died during the present year, and it was my good fortune to obtain autopsies and thus be able to present with the completed histories the specimens showing the end results in both cases.

The first case was one of carcinoma of the pylorus, for which I did a gastro-jejunostomy.

Laura W., a German woman, thirty-one years old, of healthy parentage and good personal history, was first seen by me on August 7, 1891. Eighteen months before she had been delivered of twins after a severe labor. Her convalescence had been protracted by fever, persistent vomiting and abdominal pain, with marked distention but no diarrhœa. By the end of three months most of her symptoms had disappeared, but she did not regain her original good health, being frequently compelled to seek her bed on account of vomiting. This had borne no relation to the ingestion of food, having been usually most severe in the evening, when "she vomited everything taken during the day." The appetite had been unimpaired, but there had been progressive loss of flesh and strength. The vomitus had been at times dark brown, like "coffee grounds." She had noticed for about a year a lump in her abdomen, just below the margin of the ribs on the right side. It had not been particularly sensitive and had increased but little during the two or three months preceding.

[1] Read before the New York Surgical Society, October 11, 1893.

The abdomen had been at times more distended than at others, and there had been occasional temporary attacks of slight jaundice, with light colored stools. The vomiting, unaccompanied by nausea, had lately become more frequent and her anæmia and emaciation extreme. She had been confined to bed for nearly a week by excessive weakness and for the last two days had retained literally nothing upon the stomach. On the following day (August 8, 1891) I sent her in to my service at St. Luke's Hospital.

Physical examination showed some impairment of resonance, with harsh breathing, prolonged expiration and increase of voice at right apex anteriorly. Over the rest of chest somewhat feeble breathing. There was slight comparative dulness over right upper chest. At left apex, posteriorly, a few small moist râles could be heard at the end of inspiration. The breathing at right base was feeble and somewhat jerky.

The liver dulness began at the sixth rib and continued uninterrupted to level of the umbilicus in nipple line.

Palpation of the abdomen revealed little, except that the liver projected below the ribs and that a firm, almost insensitive mass extended from its lower surface in the direction of the moderately dilated stomach. This mass descended on inspiration and gave forth a flat note on percussion. The spleen extended to the anterior axillary line. The abdominal wall was very relaxed and there was some separation of the recti muscles. There was slight impulse on coughing at umbilicus, and the striæ were very prominent. The inguinal glands could be easily felt on both sides. The tongue was slightly coated. The urine was of low specific gravity and contained a trace of albumin, but no casts.

She spent a good part of the subsequent night vomiting. On the day following thorough gastric lavage was performed and much dark brown pasty fluid evacuated of acid reaction, which contained considerable mucus, fibrinous looking shreds and many undigested grape pulps and seeds, but no free hydrochloric acid.

The patient was positive that she had eaten no grapes within ten days, remembering distinctly the occasion on which she had last eaten them. Much relief was experienced and the subsequent day found her more comfortable than for many weeks, the vomiting having ceased. On the fourth day food was withheld for several hours, and two hours after a thorough lavage a test meal of tea and toast, without butter, milk or sugar was given. After an hour and a

half this was siphoned off and found to contain no hydrochloric acid. During the succeeding month lavage was practiced every few days and the evacuated material frequently tested for hydrochloric acid without ever finding it present. For about two weeks occasional grape seeds were found in the vomitus.

The patient was unfortunately not weighed on her entrance, her weakness contradicting any unnecessary exertion, but at the end of a week, having very perceptibly gained, she was found to weigh eighty pounds. Her feebleness was still so marked that operative measures were postponed. During the succeeding months lavage was practiced every few days, and careful stomach feeding supplemented by nutrient enemata after the method of Huber[1] so improved her general condition that her weight rose to eighty-seven pounds. As improvement seemed now arrested she was prepared for operation by careful regulation of the bowels and more frequent lavage.

On September 25, 1891, assisted by my colleague, Dr. B. F. Curtis, I did a median laparotomy above the umbilicus. The mass proved to be the pyloric extremity of the stomach, enlarged, hard, and adherent to adjoining structures. The gastric walls were infiltrated by the growth for about one-third of the distance in the direction of the cardia, but it stopped abruptly at the gastro-duodenal junction, as Rokitansky has pointed out to be the rule.

The tumor was so large and fixed, and the stomach so dilated as to necessitate a second incision through the parietes, at right angles to the first, involving the left rectus muscle. Pylorectomy being evidently contra-indicated I proceeded to find a portion of the small intestine to approximate to the stomach. A loop was caught and followed some distance without recognition. On reversal of the direction of search a fixed portion was identified as the jejunum by lifting the transverse colon with the great omentum, after the method of Hahn. About two feet distant from this point a portion of intestine was selected and brought outside the abdomen. After isolating several inches by constriction with thin ribbons of iodoform gauze, the two viscera were approximated by a slight modification of the method proposed by Barker, of London.

The selected intestinal loop, and the anterior gastric wall, were laid together in such a manner that, as Rockwitz advised, their peris-

[1] A. Huber, Deutsch Archiv. f. klin. Med., Bd. XLVII.

taltic waves corresponded in direction, and their serosa united for a distance of about four inches by a line of continuous suture of black silk. Next the serosa and muscularis were incised for more than three inches parallel to and about an eighth of an inch from this line, and the now posterior free edges of these incisions united in a corresponding manner by over-hand sewing, the needle embracing a portion of the submucosa, but not entering the lumen of the gut, and the threads crossing the cut edges of the muscularis and serosa, as in the formation of a button-hole. The mucosa of the stomach was then opened, and at this point the operation was delayed until, by means of a large stomach tube attached to a syringe, a considerable amount of stomach contents could be evacuated. This having been satisfactorily accomplished without soiling the wounded surfaces I proceeded, after opening the intestinal mucosa for the same distance, to make a continuous circular suture of the gastric and intestinal mucosa. I had now two posterior lines of serous or sero-muscular suture, and a complete mucous suture. The remaining anterior layers of suture were applied in a corresponding manner, except in reverse order. The apposition thus completed consisted of three lines[1] of suture, serous, sero-muscular, and mucous, with an anastomotic opening of nearly three inches. In order to guard still further against leakage, a portion of great omentum was wrapped about the line of suture, and secured by two interrupted stitches.

The organs were then replaced in the abdominal cavity, and the wounds closed by a double layer of suture, a continuous peritoneal of fine catgut, and an interrupted extra-peritoneal of silk, including muscle and skin. The whole operation lasted an hour and fifty minutes, the actual time of suturing, sixty-one minutes, from which should be deducted from ten to fifteen minutes spent in emptying the stomach.

At the close of the operation a stimulant enema of whiskey was given, and upon the patient's reaching the ward, the foot of the bed was elevated, and the patient surrounded by hot bottles. Pulse, 135. She reacted perfectly, and passed a fairly comfortable night, after a small hypodermic of Magendie's solution of morphia.

There was some slight passive regurgitation of fluid, easily con-

[1] The writer refers not to the structures embraced in the suture, but those approximated.

trolled, however, by elevation of the head of the bed, and the application of iced cloths to the neck.

On the following day milk in small quantities, frequently repeated, was given, but soon discontinued, as it provoked nausea and vomiting. During that evening the stomach tube was introduced and about a pint of dark brown fluid withdrawn. The milk was again commenced a few hours later, but was not long retained, and its use discontinued for six hours. No further vomiting occurred. On the eighth day the stitches were removed, and union found, except at one small spot, where the edges had been everted. By the end of the second week the wound was soundly healed.

She was allowed out of bed during the fourth week, and was soon about the ward. The nutrient enemata were stopped at the end of the first week, and thereafter a gradually increasing selected diet was allowed.

She left the hospital eight weeks after the operation, and went to a convalescents' home in the suburbs, where her appetite became ravenous, and she gained rapidly in flesh and strength, her weight soon reaching 110 pounds.

She returned to her home about the 1st of December, 1891, and resumed her usual household duties, which she continued without interruption until the 1st of June, 1893. During these eighteen months she had no vomiting, and but little discomfort of any kind, except that during the last three months she had been perceptibly growing thinner and weaker. Her weakness and emaciation increased more rapidly from that time, so that by July 4, 1893, her weight had fallen to seventy-seven and a fraction pounds, just about the condition in which I first saw her, except that now there was no vomiting, only a dull pain in the abdomen, and excessive weakness. She died from exhaustion on July 31, 1893, a few days over twenty-two months from the time of operation, and about three years from the time when the lump was first discovered in her abdomen.

The autopsy showed:

A tall, greatly emaciated frame, with little or no panniculus adiposus; left lung, no adhesions—upper lobe, several cavities, cheesy nodules, and a few small tubercles, lower lobe, few cheesy nodules and tubercles; right lung, many adhesions and gray tubercles, cheesy nodules, and small patches of broncho-pneumonia; liver, spleen and kidneys negative; bladder, in post, right wall a flat mass one millimetre in diameter, and yellowish in color.

Transverse colon and omentum adherent to abdomen wall at one point of cicatrix near umbilicus. In the small intestine, twenty-eight inches from the pylorus, an anastomosis with the stomach.

The entire gastric wall, except the left third, extremely thickened and indurated. The finger could be forced through the pylorus. The inner surface of the stomach nodular with red and black discoloration. An anastomosis along the greater curvature of stomach one-third of the way from cardia.

Intestines, a few small tubercular ulcers and a large one in cæcum.

The stomach with the adherent intestine was removed entire and sent to Dr. John S. Ely, of the Pathological Department of the College of Physicians and Surgeons, who reported as follows:

"The specimens consist of the stomach, a small portion of the liver, part of the transverse colon and a loop of jejunum.

"The stomach is somewhat smaller than normal, measuring about twenty-three centimetres from fundus to pylorus. At its pyloric extremity is a mass (4.5 x 2.2 centimetres) occupying the wall of the organ and causing almost complete occlusion of the pyloric opening, which is now not more than two millimetres in diameter. This mass is abruptly limited at the gastro-duodenal junction, but is continuous in the opposite direction with an extensive infiltration of the stomach wall. This infiltration involves the entire gastric wall, with the exception of a more or less circular area at the fundus about five centimetres in diameter, but is not uniform in thickness over the whole of this extensive surface. The most considerable unevenness is near the pylorus, where two polypoid ingrowths (4.5 x 1.2 x 1.3 centimetres, and 2.8 x 1 x 0.7 centimetres respectively, the last number in each case representing its elevation above the mucous membrane), projecting from the posterior wall, must have acted to obstruct the passage of food from stomach to duodenum. Microscopical examination shows the growth at the pylorus and the infiltration of the wall of the stomach to be due to its involvement by colloid carcinoma. Near the middle of the greater curvature of the stomach, on its anterior surface is an opening (14 x 7 millimetres), somewhat pyriform in shape, through which the index finger may be passed into the lumen of the jejunum. The edges of this gastro-jejunal opening are involved in the general gastric infiltration above referred to, but no infiltration of the

jejunum itself below this point is discoverable. The loop of jejunum is firmly attached to the stomach by fibrous adhesions, in which a portion of the omentum seems also to be included. Behind this loop of jejunum is the transverse colon, the jejunum having been lifted at the operation over and in front of the colon. Firm adhesions with a portion of the colon to the anterior abdominal wall where it passes behind the cicatrix of the laparotomy."

The second case was one of malignant stricture of the sigmoid flexure for which I did a colo-rectostomy, also with success.

Thomas H. F., an Irishman, fifty-seven years of age, of good family and personal history, had formerly been a railroad engineer, but for the previous six years had worked at burnishing the soles of shoes. During this period he suffered from mild dyspeptic symptoms, which he attributed to the confinement and character of his work and to the poor quality of his meals. For the last six months his abdominal distress had been more marked, sometimes amounting to real pain, and much increased by the ingestion of food. There had been little or no impairment of appetite, never any vomiting, and but slight constipation.

On December 28, 1891, he had been forced to give up work on account of the almost constant pain and distention of the abdomen. Two days later he entered Bellevue Hospital. On account of the distention nothing abnormal could then be discovered. Repeated cathartics and all kinds of enemata failed to cause movements of any size, or to reduce the distention until about the end of January, when he had several large movements and the distention disappeared. Careful palpation then revealed a small, hard, movable nodule in the left iliac fossa. There had been at no time any continuous temperature, only occasional slight elevations above the normal. He remained out of bed quite comfortable until February 7, 1892, when the belly began again to swell and pain and constipation returned. No improvement taking place, he was referred to me by my medical colleague, Dr. W. B. James, with the diagnosis of chronic intestinal obstruction, probably from malignant disease.

After the usual preparation a median laparotomy below the umbilicus was performed on February 17, 1892, and, on exploration of the iliac fossa, a portion of the sigmoid flexure was found markedly constricted by a growth in its walls. The whole circumference of

FIG. 1.—Remote Result of Gastro-jejunostomy.

A.—Pylorus. *B*—Anastomotic opening. *C.*—Jejunum. *D.*—Liver.

the gut was involved for about an inch, and as a result of this contraction the intestine above and below was distended.

As it was impossible to drag the diseased portion through the wound, and as the retroperitoneal glands were involved, I rejected excision and made an anastomosis between the bulging portions above and below the constriction. The technique of the operation differed in no respect from that of the last case, the opening having been nearly as large. The lines of sutures were reinforced by the neighboring appendices epiploicæ. At the end of the eighth day the wound was completely healed and all sutures removed. After two weeks he was allowed up and resumed regular diet. The bowels moved freely a few hours after the operation, and all distention permanently disappeared. There was no rise of temperature above 100.8° F., and that only on the day succeeding the operation. He soon returned to work, and from that time all his bodily functions were normally performed. Early in January, 1893, he began to lose flesh and strength, and gradually became weaker and weaker, dying on February 5, 1893, nearly a year after the operation, during which time he had no suffering except at the very last, when he complained of vague abdominal distress.

At the autopsy the abdomen was alone opened, and found to be the seat of a general cancerous peritonitis, there being deposits in nearly all the organs.

The specimen was removed entire and, as with the last, given to Dr. Ely.

The specimen consists of the sigmoid flexure of the colon, of two loops of small intestine and of a mass constituting the centre of the whole, and to which the portions of intestine above-mentioned are attached by firm adhesions. The dimensions of this mass, as nearly as can be determined, are 4.3 x 5.2 x 3.6 centimetres. Microscopical examination shows it to be large alveolar carcinoma.

At about the middle of the sigmoid flexure of the colon is the cicatrix of anastomosis.

Scattered here and there, over the peritoneal surface of the colon and in the mesentery, are small metastatic tumors of different sizes, up to six millimetres in diameter. These also show the structure of carcinoma.

A square window cut in the colon just above the line of cicatrix affords a view of the interior of the colon. Immediately opposite this window, *i.e.*, above the cicatrix, is a mass (3.7 x 3 x 1.3 centi-

metres) extending into the lumen of the colon, which is consequently narrowed to a very considerable extent. A little to the right of the centre of this mass, as seen from the window, is a small opening (6 x 4 millimetres) leading into the mass, and representing the original lumen of the colon, the degree of occlusion of which is represented by the diameters of this opening above given.

Below this mass, and visible both from the window and through the lumen of the colon from below (see Fig. 2), the artificial lumen of the gut at the point of anastomosis may be seen, corresponding in location with the cicatrix seen externally. This opening is somewhat crescentic in shape, its convexity being away from the neoplasm and toward the cicatrix. Its longest diameter is two centimetres, its shortest five and a half millimetres. The sharp convex edge of this crescentic opening marks the line of cicatrix, and measurement of the thickness of the cicatrix (from the edge of the artificial lumen to its peritoneal surface) may fairly be taken as representing the degree of contraction of the cicatrix at the point of operation. This is at most nine millimetres.

The two cases above reported may well serve not only to typify, but also to contrast malignant stenosis of the gastro-intestinal tract, at the two most frequent seats of invasion.

They markedly emphasize, too, the beneficial results of palliative operations in such cases as preclude the possibility of radical measures, and I must confess to a feeling of deep satisfaction at their end results since, with an absolutely fatal prognosis from the very beginning, increased length of days and, therefore, usefulness, with almost entire freedom from the suffering incidental to the disease, was granted in both instances until the end of life. At the present time a sharp distinction must always be drawn between radical and palliative procedures for malignant disease, and the latter only be considered when the former are of necessity inadmissible.

Gastric and intestinal cancer pursue a somewhat different course, and present, in some respects, entirely dissimilar symptoms. Thus in the former, to the final cachexia of the disease, is early added an intense anæmia with emaciation, which, in itself, determines a comparatively rapid termination, with great suffering from pain and vomiting, while in the case of the latter, trifling

FIG. 2.—Remote Result of Entero-anastomosis.

A.—Opening through stricture. *B.*—Anastomotic opening.

constitutional disturbance with slow progress is the rule until death occurs either from acute obstruction or exhaustion due to extension of the disease and general systemic involvement.

The conditions of the palliative operative measures also vary, depending on whether to the purely mechanical obstruction grave interference with digestion and assimilation is added. Thus when the disease is located in the upper portion of the tract, patency of the canal must be restored with a minimum of digestive exclusion, while in the lower portion comparatively large areas may be excluded without detriment to health.

The restoration of patency is common to all situations, and the object of the paper is not to review the various methods which have been adopted for that purpose, but to again call attention to certain facts which seem to have been overlooked, or at least placed in the background by many of the most prominent writers on the subject of anastomosis for obstructive malignant gastric disease.

In order to do this to best advantage a concise review of the salient features of the disease seems profitable, together with a statement of the manner in which its presence interferes with normal functions, the results of such interference, and the logical indications for treatment as deduced from these considerations. In all that follows, originality of thought or expression is utterly disclaimed, and the works of all authors bearing upon the subject have been freely appropriated for the purpose above stated.

As to frequency, statistics show that about two-fifths (40 per cent.) of all cancers attack the stomach. This situation being, next to the uterus, the most frequent seat of primary growth (Osler), 21.4 per cent. in a total of 30,000 cases (Welch).

It originates here invariably in the mucous layer. Starting from the glandular epithelium it rapidly extends through the muscularis mucosæ to the submucous coat, and is often associated with considerable hypertrophy and thickening of the neighboring connective and muscular tissues (Strümpfel).

It progresses, as a rule, slowly at first, showing little tendency to infiltrate the neighboring structures until fairly well advanced, and, when situated at either orifice, often causes death

by mechanical obstruction before its victim is overtaken by general exhaustion [illegible].

According to Delafield and Prudden the new growth usually follows one or another of three types.

(1) A circumscribed flat tumor whose mucous surface necroses to a greater or less degree, leaving varying-sized ulcers, which may or may not perforate the wall.

(2) Tumors, often of large size, which project into the gastric cavity.

(3) A diffuse flat infiltration of variable extent, which does not ulcerate and hardly forms a tumor.

These different types may exist alone or in combination.

Heredity has a slight but undeniable influence in its causation (Strümpfel), and there is sometimes a very probable connection with antecedent ulcer (Hauser).

It is about equally distributed between the two sexes, the male, if anything, being favored, and occurs, in the majority of cases, between the fortieth and seventieth year, the maximum liability being between fifty and sixty, and it being rare before thirty.

Its average duration is from six to fifteen months, and it proves fatal in the majority of cases within two years.

In a little over one-half the cases (three-fifths, Welch) the disease is located in the pylorus, and of these only one-half present conditions favorable for a radical operation (Bull).

There is a tumor in 80 per cent. (Brinton-Lebert), pain in 90 per cent., and vomiting, as a rule, when the orifices are involved.

Metastases are frequent (one-fourth), usually in glands and liver.

It is a disease obscure in its symptoms, frequent in its recurrence, fatal in its event (Brinton), the course of which, as a rule, is progressive, irresistible and advancing toward a fatal termination (Ewald).

Most of the cases exhibit a combination of grave digestive disturbances, with a relatively rapid loss of flesh and strength (Strümpfel), but it assumes many curious clinical features (Welch).

In the normal stomach, normal relations exist between pyloric resistance, contractility and contents (Osler), and in certain forms of disease the requisite relationship may be preserved by compensation, in spite of abnormal change of the individual factors (Ewald). As a rule, however, injury to one involves the others.

In pyloric cancer the resulting gastrectasis depends not only upon the degree of pyloric stenosis, but, secondarily, upon the atonicity of the muscularis from chronic catarrh with atrophy of the glandular elements, and upon the inhibition of the motor nerve fibres by elements of decomposition (paralytic dilatation).

Exceptionally, however, circumscribed cancerous infiltration and ulcerations, which do not cause stenosis but destroy a portion of the gastric muscle, result therefrom if their growth be slow enough, in hypertrophic dilatation by interference with normal peristalsis. On the other hand, pyloric stenosis of marked degree *may* exist without dilatation.[1]

The pyloric stenosis can be produced as well by an ingrowth of the tumor, acting or not in a valve-like manner, as from the inability of the hypertrophied and thickened muscularis to contract, and may be intensified by distortion due to the weight of the tumor (Glénard).

Because of the glandular atrophy there is an *impairment of the secreting function*, and, finally, according to Riegel, the gastric juice entirely loses the digestive property (v. Jaksch). With the stagnation of stomach contents *absorption is seriously* disturbed, and from the delay in removal, and, therefore, formation of absorbable substances, *paresis of the motor elements* from products of decomposition, still further favors stagnation, there being little or no hydrochloric acid present "to maintain the ingesta in a state of asepticity." No more vicious circle can be imagined.

[1] Report from Heidelberg clinic by Czerny and Rindfleisch. "A case of small cell alveolar, carcinomatous infiltration, which extended throughout the submucosa like the carcinoma lenticulare mammæ and presented dilatation of the stomach." ANNALS OF SURGERY, Vol. 17, p. 735.

Von der Velden was the first to note that, in most cases of cancer, the gastric juice had comparatively feeble digestive power, and contained no free hydrochloric acid, and Riegel discovered that even normal gastric juice had its digestive powers weakened if the secretion of a cancerous stomach was added to it.

In the rare cases of cancer in which the secretion of hydrochloric acid has persisted until death, the mucous membrane has been found normal, except in the immediate locality of the cancer, so that its presence "points with very great probability against the existence of cancer," for, "in the majority of cases, its formation is entirely suppressed." As the disease progresses nutrition becomes more and more impaired, until a highly-marked marasmus appears, a cachexia with progressive anæmia and wasting, which, in the character of its blood changes, closely resembles that of pernicious anæmia, a disease associated with similar atrophic gastric conditions.

We know that of the food, ultimately oxidized in the body to its end products, only a small portion serves the purpose of tissue reconstruction, the larger being used to generate the heat requisite for the maintenance of life (Einhorn).

Now, it has been shown by Von Noorden and others that emaciation in chronic diseases of the stomach is caused, in the vast majority of cases, if not in all, not by specific poisons circulating in the organism, but by starvation (the digestion and assimilation of too little food to replace tissue waste), and again it has been experimentally (Ogata), as well as clinically, proven (Leube-Ewald) that, in grave disturbances of the digestive functions of the stomach, the intestine can vicariously perform the work in a complete manner. For example, in cases of atrophy of the mucous membrane in which the gastric secretion has entirely ceased, patients can, under a proper regimen, maintain their usual weight, and, in fact, often gain and live long without any discomfort whatever (Einhorn).

There is not at present any operation which can ensure the cure of cancer of the stomach (Guinard), and, while it is difficult to arrive at the position of palliative operations (Barker), it may

still be said to have been clearly shown that a fistulous communication between the stomach and bowel may be established *even in very debilitated subjects*, without great risk to life (Paul), and although it does not cure, it affords relief from the torments of starvation, and incessant vomiting, and, with these benefits, the prolongation of life (Page).

It is difficult to understand how, with a full appreciation of the principles above stated, the selection of the intestinal loop could then be left to chance, as advised by Luecke and others, a definite method being imperative to ensure success. Those who seek for a fixed point, the plica duodeno-jejunalis, as a means of identification, are the most certain and scientific (Hahn, Jessett, etc.).

It seems to me that the purpose of the operation has been thus clearly outlined in the data which I have above superficially sketched, and I believe that at the present time improved surgical technique, with the knowledge gained by experience, warrants, on the part of the surgeon, an offer, to those suffering from this incurable disease (*the most* distressing symptoms of which depend largely on *remediable* conditions), of relief, from unnecessary suffering with extension of life, at a comparatively little proportionate risk.

As a result of experience we endeavor to operate as early in the disease as possible, or, if debility is already present, postpone interference until, by means of systematic lavage with careful gastric, supplemented by rectal, nourishment, the general condition improves.

We have also learned:

(1) That the size of the anastomotic opening must be large on account of the tendency to contraction.

(2) That in case of the stomach it should be as near as possible to the greater curvature and nearer the fundus than the pylorus, so as to be not only as far distant as possible from the disease, but, at the same time, in the most favorable situation for the passage of the contents of the stomach into the intestine.

(3) That the jejunum, about thirty inches from the pylorus, is the proper portion of the intestine to approximate, and that

its opening should be placed midway between mesenteric attachment and extreme convexity.

(4) That in the approximation the loop must be so arranged that its peristaltic wave corresponds with that of the stomach.

(5) That the tide of opinion seems to favor a union which shall represent, as far as possible, that of the different anatomical layers the ideal operation), rather than through the medium of artificial aids (Wölfler, Halsted, Barker, Abbe).

6) That as in all intra-abdominal operations our manipulations must be so performed as to favor to the slightest degree ultimate adhesions between adjacent structures.

In originating the operation, Wölfler prophesied its present extended application when he said, " Perhaps a further experience will show that this kind of entero-plasty will, not only in carcinoma of the stomach, but also of the intestine, be able to replace the formation of an intestinal fistula " (external).